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10/662,394	09/16/2003	Yuichi Akiyama	1344.1125	2179

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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/662,394	AKIYAMA ET AL.	
	Examiner	Art Unit	
	DANNY W. LEUNG	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 January 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *4-14* is/are allowed.

6)☒ Claim(s) *1,3,15 and 16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see pages 7-9, filed 1/29/2010, with respect to claims 1-14 have been fully considered and are persuasive. The 103 rejections of claims 1-14 has been withdrawn.

The prior art made of record does not teach

"measuring a value of said degree of polarization of said optical signal **after a predetermined amount of time has elapsed** from a time when said initial value was stored; and

determining a change amount in an optical signal to noise ratio of said optical signal according to a change of said measured value of said degree of polarization relative to said stored initial value,

wherein **said predetermined amount of time** is set to measure the change in said degree of polarization due to a change in the optical signal to noise ratio, when a change in said degree of polarization due to a change in a polarization mode dispersion is compensated."

2. Applicant's arguments, see page 15-16, filed 1/29/2010, with respect to claims 15-16 have been fully considered but they are not persuasive.

Applicant's arguments do not comply with 37 CFR 1.111(c) because they do not clearly point out the patentable novelty which he or she thinks the claims present in view

of the state of the art disclosed by the references cited or the objections made. Further, they do not show how the amendments avoid such references or objections.

Applicant merely cited portions of claims 15 and 16, and stated that it is patentably distinguishes over the applied prior art without specifically pointed out how is it different from **combination of Chou and Olsson** as applied to the recited limitations.

3. As stated in the last office action, **Chou** teaches an optical transmission system *(fig 1)* for compensating varying PMD by first monitoring state of polarization using polarimeter 110, storing this initial value of a degree of polarization to computer 120, and then determine the amount of compensation need by collecting a set of measurements over a period of time, *(col 7, ln 13-44; col 9, ln 8-27, computer 120 runs algorithm 600 repeatedly over a predetermined amount of time to collect these data points).*

Chou further teaches in another embodiment *(fig 9)*, as stated on page 5 of the last office action, that another polarimeter *(fig 9, 770)* is used to measure the change in degree of polarization due to a change in a polarization mode dispersion when the polarization mode dispersion is compensated *(fig 9, polarimeter 770 is located after polarization transformer 750, used to measure the degree of polarization after a change in polarization mode dispersion is compensated by polarization transformer 750; CPU 780 continuously calculate this DOP value and sent it to CPU 720 for comparison to the initial measured value (col 11, ln 10-41)).*

Therefore, **Chou's** embodiment as shown in *(fig 9)* makes it obvious to measure the change in degree of polarization both before and after the signal is being compensated

for polarization mode dispersion, so that it can determine if the polarization compensator is functioning correctly and if the signal need further compensation.

4. **Chou's** teachings is analogous to applicant's invention as shown in figure 12, with the exception that **Chou** does not measure signal to noise ratio based on the polarization measurements. As stated in the last office action, *and concurred by the applicant on page 8 of remarks filed 1/29/2010,* **Olssom** teaches a monitoring module that can measure power, state of polarization, and degree of polarization *(col 11, ln 1-6),* and using these measurement, a processing unit can extract information about *(i.e. calculate)* signal power at each WDM channel, optical signal to noise ratio at each channel, degree of polarization of each channel, etc. *(col 11, ln 10-31),* **Olsson** further stated that these calculation can be performed as a function of time, and thus be able to draw conclusion about trends and degradations of the optical system *(col 11, ln 32-34)*.

Applicant argues that (a) *"**Olsson** does not anticipate or render obvious that the extracting information and the conclusions are combined, and thus, Olsson does not teach that the decay in OSNR is determined based on the degree of polarization".* Examiner respectfully disagree. As explained above, **Olsson** clearly stated in *(col 11, ln 1-34)* that the processing unit may calculate OSNR *(amongst other things)*, using the measured data including the measurement of degree of polarization *(amongst other parameters)*. That is, the calculation of OSNR is based on a set of measured parameters, including degree of polarization. **Olsson** further stated that the processing unit performs this calculation over a function of time in order to determine trends and degradations

(such as change amount in OSNR, and change in measured value of degree of polarization). Therefore, **Olsson's** disclosure suggests a method of "determining a change amount in an optical signal to noise ratio of said optical signal according to a change of said measured value of said degree of polarization relative to said stored initial value". Such technique may be used to calculate signal to noise ratio in **Chou's** system with the computer using the degree of polarization measurements, and the result of which would have been predictable to one of ordinary skill.

Applicant further argues that (b) *"**Olsson** do not anticipate or render obvious any correlation between the change in OSNR and the change in a measured degree of polarization... The mere monitoring in time of measured value does not teach or suggest existence of the correlation which occurs after an interval of time at which a certain condition (i.e. "a change in said degree of polarization due to a change in a polarization mode dispersion is compensated") is met"*. However, applicant's invention, at least as shown in figure 12, functions the very same way of calculating SNR by monitoring a measured value of degree of polarization, and draw some sort of conclusion over a period of time. Therefore, **Olsson's** calculation process using a measured value over a period of time is analogous to applicant's invention. And the limitation of monitoring *"a change in said degree of polarization due to a change in a polarization mode dispersion is compensated"*, is taught by **Chou's** figure 9 as discussed above.

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1, 3, 15 and 16 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. Supreme Court precedent (*Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876).) and recent Federal Circuit decisions *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008) indicate that a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing. While the instant claim recites a series of steps or acts to be performed, the claim neither transforms underlying subject matter nor positively ties to another statutory category that accomplishes the claimed method steps, and therefore does not qualify as a statutory process.

For example the optical signal to noise monitoring method including steps of "storing an initial value of a degree of polarization…, measuring a value of said degree of polarization…; and determining a change amount in an optical signal to noise ratio of said optical signal…", in claims 1, 3, 15, and 16 are of sufficient breadth that it would be reasonably interpreted as a series of steps completely performed mentally, verbally or without a machine.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Furthermore, the key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious. The Supreme Court in *KSR International Co. v. Teleflex Inc.* note that the analysis supporting a rejection under 35 U.S.C. 103 should be made explicit. The Court quoting *In re Kahn* 441 F.3d977,988,78 USPQ2d1329,1336(Fed.Cir.2006) stated that "[R]ejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness."

7. Claims 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Chou et al.** *(US006859268)* in view of **Olsson et al.** *(US006765670B2).*

Regarding claim 15, **Chou** discloses a method of monitoring a signal transmitted in an optical system, comprising: determining a difference between a measured value of a degree of polarization of said optical signal at a time when the change in the degree of polarization due to a polarization mode dispersion is compensated and an initial value of the degree of polarization *(fig 9, polarimeter 730 measures an initial value of degree of polarization; after polarization mode dispersion is compensated using compensator 750, degree of polarization is measured again using polarimeter 770, the difference between these two measured values are compared using computer 720 (col 10, ln 51-col 11, ln*

40)). **Chou** does not disclose expressly determining a change amount in the signal to noise ratio of the optical signal based on the difference between the measured values. **Olsson,** from the same field of endeavor, teaches a method of monitoring a signal to noise ratio of a signal transmitted in an optical system, comprising: determining a change amount in the signal to noise ratio of the optical signal based on a difference between a measured value of a degree of polarization of said optical signal *(col 11, ln 1-34, a processing unit in the monitoring hub 32 can calculate OSNR, signal power, etc. using measured data such as power, state of polarization, and degree of polarization. The calculation is perform as a function of time, such that when there are changes in the measurements, trends and degradations of the calculated values can also be observed).*

Therefore, it would have been obvious for a person of ordinary skill in the art at the time of invention to determining a change amount in the signal to noise ratio of the optical signal using **Olsson's** method in **Chou's** system according to a change between a measured value of the degree of polarization obtained in **Chou's** degree of polarization measuring section relative to said stored initial value measured during the predetermined period of time. The motivation for doing so would have been to be able to observe OSNR trends and degradations in **Chou's** system.

Regarding claim 16, **Chou** discloses a method of monitoring a signal transmitted via an optical fiber *(fig 9),* comprising:

correcting a received signal by compensating for a polarization mode dispersion of the signal along the optical fiber *(col 11, ln 1-19, CPU 720 continuously monitors DOP value calculated by CPU 780 to determine delay needed at 760 to compensate for PMD);*

splitting a part of the signal which has been corrected for polarization mode dispersion *(fig 9 signal from delay module 760 is split to the receiver and the polarimeter)*; and

measuring a degree of polarization of the part of the signal at different times *(fig 9, polarimeter 770 continuously measure the DOP and store them at CPU780),* and comparing the measured degree of polarization with a reference value of the degree of polarization to monitor a change in DOP *(col 11, ln 10-19),* wherein if the measured degree of polarization exceeds the reference value, the reference value is set equal to the measured degree of polarization, and the measured degree of polarization is also used to control the compensating for the polarization mode dispersion *(col 11, ln 19-53, CPU detects a decrease in DOP, and determine a new trailing PSP, a reference value, and it is used to determine the PMD time delay, which is used for compensate for PMD).*

Chou does not disclose expressly wherein the comparing the measured degree of polarization with a reference value of the degree of polarization is to monitor a change of the signal to noise ratio.

Olsson, from the same field of endeavor, teaches a method of optical SNR calculation for monitoring a change of signal to noise ratio based on a change of the measured degree of polarization *(col 10, ln 63-col 11, ln 34, decay in Optical SNR can be*

determined based on information extracted from degree of polarization measurement data).

Therefore, it would have been obvious for a person of ordinary skill in the art at the time of invention to monitor a change amount in the signal to noise ratio of the optical signal using **Olsson's** method in **Chou's** system based on a change of the measured degree of polarization in **Chou's** degree of polarization measuring section. The motivation for doing so would have been to be able to observe OSNR trends and degradations in **Chou's** system.

Allowable Subject Matter

8. Claims 4-14 are allowed.

9. The following is an examiner's statement of reasons for allowance:

Prior art made of record fails to teach,

Regarding Claim 4,

An optical transmission system in which an optical signal is transmitted from an optical transmission apparatus to an optical receiving apparatus via an optical transmission path, comprising:

a degree of polarization measurement section that measures a degree of polarization of said optical signal; and

an optical SNR calculation section that stores an initial value of said degree of polarization of said optical signal, and determines a change amount in an optical signal to noise ratio of said optical signal according to a change between a

measured value of the degree of polarization obtained in said degree of polarization measuring section relative to said stored initial value, wherein said degree of polarization measurement section that measures said degree of polarization of said optical signal after a **predetermined amount of time** has elapsed from a time when said initial value was stored, and said **predetermined amount of time** is set so that said degree of polarization measurement section to measure the change in said degree of polarization due to a change in the optical signal to noise ratio, when a change in said degree of polarization due to a change in a polarization mode dispersion is compensated.

10. The examiner found no suggestions or motivations to combine similar teachings from prior art made of record *(as cited in 103 rejections to claims 15-16 above)* to overcome the limitations as discussed above regarding claim 4, and corresponding limitations in claim 12.

11. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

12. The prior art made of record in previous action(s) and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to further show the state of the art with respect to measurement of Degree Of Polarization and Optical Signal to Noise Ratio in optical communications in general:

(US-20040067057 or US-20030202795 or US-20020024704 or US-20010028760 or US-20020018265 or US-20010008452 or US-20040202480 or US-20060245680 or US-20020018266) or (US-6813021 or US-5659412 or US-6317240 or US-5327511 or US-7024111 or US-6950611 or US-6807321 or US-6707541 or US-6681081 or US-6678431 or US-6570682 or US-6310709 or US-6671464 or US-5930414 or US-7050658 or US-7027198 or US-7030973 or US-7024058 or US-7043122 or US-6130766 or US-6901225 or US-6671045 or US-6421153 or US-6097525 or US-6934479 or US-7006736) or (US-5949560 or US-6792168 or US-6710904 or US-7067795 or US-6690454 or US-6859268 or US-5994898 or US-6947194 or US-5986746 or US-6154273 or US-6885820 or US-7218436 or US-7308204 or US-7203428 or US-7142736 or US-6631221 or US-7206522 or US-6895188 or US-6934433 or US-6654105 or US-6765670) or (US-20020048062 or US-20010008452).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANNY W. LEUNG whose telephone number is (571)272-5504. The examiner can normally be reached on 10:00am-8:00pm Mon-Thur.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DANNY W LEUNG
Examiner
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/D. W. L./
Examiner, Art Unit 2613
5/12/2010

/Kenneth N Vanderpuye/
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